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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,762	01/21/2005	Volker Lohweg	W1.1914 PCT-US	2612

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EXAMINER

YEH, EUENG NAN

ART UNIT	PAPER NUMBER
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2624

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01/22/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,762	Applicant(s) LOHWEG ET AL.	
	Examiner Eueng-nan Yeh	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-36 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 15-36 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>Jan 21, 2005</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. Figures 1 and 2 are missing.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. Drawings are stated in paragraph 24 but no figures attached with this application.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 15-20, 23-24, and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Swain et al. (International Journal of Computer Vision 7:11, Nov 1991 11-32), Macfarlane et al. (US 2002/0021444 A1), Shiratani (US 6,950,554 B2), and Baba et al. (US 6,911,963 B2).

Regarding claims 15 and 16, Swain discloses a color image deviation analysis method comprising:

an image sensor; using said image sensor for generating image sensor signals of an image (as figure 1 showed "the output image from a color camera together with a color histogram obtained from the image" at page 13, right column, line 14. The image sensor is a part of the color camera);

a separate image sensor signal for each of first, second and third color channels ("The color axes used for the histograms were the three opponent color axes, defined as follows (Ballard & Brown 1982):

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$$rg = r - g$$

$$by = 2 * b - r - g$$

$$wb = r + g + b$$

Here r, g, and b represent red, green, and blue signals, respectively. The rg, by, and wb axes are analogous to the opponent color axes used by the human visual system ..." at page 16, left column, line 1. Thus, the sensor signals are separated to red, green, and blue as first, second and third color channels, respectively);

linking said first color channel image sensor signal with said second color channel image sensor signal using a first calculation specification; generating a first output signal of a first compensation color channel using said first and second linked color channel image sensor signals (discussed above, $rg = r - g$, as the first calculation specification and rg is the first output signal);

linking said third color channel image sensor signal with said first and second color channel image sensor signals using a second calculation specification; generating a second output signal of a second compensation color channel using said linked third color channel image sensor signal and said first and second color channel image signals (discussed above, $by = 2 * b - r - g$, as the second calculation specification and by is the second output signal);

forming said first compensation color channel corresponding to a red/green receptive field of a human eye (discussed above that the rg, by, and wb axes are analogous to the opponent color axes used by the human visual system. The first output signal rg corresponding to red/green);

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forming said second compensation color channel corresponding to a blue/yellow receptive field of a human eye (discussed above that the rg, by, and wb axes are analogous to the opponent color axes used by the human visual system. The second output signal by corresponding to blue/yellow);

Swain does not explicitly disclose the weighting factors. Furthermore, Swain does not explicitly teach the classification and minimum value selection.

Macfarlane, in the same field of endeavor of color measurement system ("evaluating the color of skin, teeth, hair and material substances with a Color Index" in paragraph 5, line 2), teaches weighting factors for the reflectance spectrum as described in Table 1 in paragraph 46. "weighting of said reflectance spectrum with weighting factors corresponding to four color components that form two opponent pairs of color components wherein said weighting factors are used to calculate said sample's reflectance spectrum's contribution to said four color components' appearance; and determining individual contributions corresponding to each of said four color components and calculating said Color Index ..." in paragraph 21, line 1. Furthermore, "evaluating the color of skin, teeth, hair and material substances with a Color Index that is independent of the illuminating condition" in paragraph 12, line 2.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the color image deviation analysis method Swain made with weighting factors applicable to the channel image signals as taught by Macfarlane, not only to provide color signals "independent of the illuminating condition" in paragraph 12,

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line 4, but also can be used to generate weighted difference for the first and second calculation specifications.

The Swain and Macfarlane combination does not explicitly teach the classification and minimum value selection.

Shiratani, in the field of endeavor of image classification ("classifying a plurality of images on a predetermined reference" at column 4, line 13), teaches the classification process as depicted in figure 1, numerals 107 and 108 "section 107 extracts the feature such as color, shape texture or the like from the designated region" at column 9, line 18; "reference numeral 108 denotes a learning section of a classification parameter for adjusting parameters in the system so that the set of feature data can be classified ..." at column 7, line 46. Without departing from the scope and spirit of Shiratani's methodology, the color as the feature extracted can be the said first and said second output signals to be used for classification.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the color image deviation analysis method of the Swain and Macfarlane combination, with classification technique as taught by Shiratani so the output signals can be properly classified.

The combination of Swain, Macfarlane, and Shiratani does not explicitly teach the concept of minimum value selection between first and second colors as stated in claim 16.

Baba, in the field of endeavor of color image display ("relates to a field-sequential color display unit and display method" at column 1, line 15), teaches color display:

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"display colors of the primary color signals may include red, green and blue, and the display color of the non-three-primary color picture signal may be any one of white, cyan, magenta and yellow which are generated from the at least two primary color signals. The non-three-primary color signal displayed in the sub-field period may be determined on the basis of a part of the input image information in one frame period" at column 4, line 4. And "The non-three-primary color signal generator may include a signal separating circuit separating the three-primary color signals from the input picture signal, and generate the non-three-primary color signal from the three-primary color signals separated by the signal separating circuit" at column 5, line 1. As depicted in figure 5, numeral 16: "...three-primary color signals are inputted to the signal separating circuit 16 to prepare a W signal by the minimum value of the R, G and B signals, a Y signal by the minimum value of the R and G signals ..." at column 11, line 1. With the W, Y, M, and C color used "...color difference there between being smaller than the color difference between the three-primary color picture signals R, G and B, and the intensities of the three-primary color picture signals R, G and B decrease, so that it is difficult for the observer to perceive color breakup" at column 12, line 9.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the color image deviation analysis method of the Swain, Macfarlane, and Shiratani combination, with the Y signal selection between the minimum value of the R and G signals as taught by Baba, in order to "reducing the color breakup of an optical image" at column 3, line 50.

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Regarding claims 17 and 18, said first, second, and third color channels corresponding to the basic colors of an RGB model wherein R is red, G is green and B is blue (discussed in claims 15 and 16, the sensor signals are separated to red, green, and blue as first, second and third color channels, respectively).

Regarding claims 19 and 20, said first, second and third color channels with adaptable spectral sensitivity (discussed in claims 15 and 16, the three color channels are red, green, and blue, respectively. And the three opponent color axes are rg, by, and wb which are analogous to the opponent color axes used by the human visual system).

Regarding claims 23 and 24, weighting each of said first, second and third color channel image sensor signals with a coefficient (discussed in claims 15 and 16, weighting factors applied to each color channel image sensor signal).

Regarding claims 27 and 28,
providing a learning mode and an inspection mode (depicted in Shiratani figure 2a the learning step and figure 2b the classification step);
forming reference data values of at least one reference image using said first and second compensation color channels (discussed in claims 15 and 16, said first and said second output signals of said first and second compensation color channels are classified. As depicted in Shiratani figure 2a, numeral ST108: "the classification

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parameter learning section 108, a feature vector is prepared from the extracted feature and a classification parameter is learned and determined so that the feature parameter can be classified in accordance with the teacher signal (step ST108)" at column 9, line 21. Thus, the reference data values are formed. Furthermore, "a learning type image classification apparatus which is capable of classifying a plurality of images" at column 4, line 12);

storing said reference data values in a reference data memory (as depicted in Shiratani figure 1, numeral 113);

forming inspection images as inspection output signals using said first and second compensation color channels (discussed in claims 15 and 16, said first and said second output signals of said first and second compensation color channels are used for image processing. As depicted in Shiratani figure 2b, steps ST109 to ST112 to form the inspection images);

comparing said inspection output signals with said reference data values in said reference data memory pixel by pixel (depicted in Shiratani figure 2b, steps ST113 "the feature vector of each region is classified by using a classification parameter which has been learned and the category determination section 111 determines to which category the region belongs (step ST113)" at column 9, line 53. Furthermore, "the learning type image classification program which is executed at each section is recorded on the recording medium 113 (*figure 1*)" at column 9, line 62. The region is clipped by user or automatically performed by the system, "... provided a region clipping mode selection

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section ..." at column 10, line 51. And the clipped region can also be as small as a pixel for pixel-by-pixel processing).

Regarding claims 29 and 30, a classification system for comparing said inspection output signals with said reference data values (discussed in claims 27 and 28, said inspection output signals were compared with said reference data values for classification).

Regarding claims 31 and 32, selecting said classification system from linear and non/linear classification systems including threshold value classifiers, Euclidian distance classifiers, Bayes classifiers, fuzzy classifiers and artificial neuron networks ("...as a result of the learning of the classification parameter, for example, at a kohonen type neural net, the neuron element corresponds to a representative vector in the vector quantization so that the neuron element is set in a state in which a label representing the classification category name is added to this representative vector ..." at Shiratani column 9, line 30).

6. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Swain, Macfarlane, Shiratani, and Baba as applied to claims 15 and 16 discussed above, and further in view of Yamaguchi (US 5, 268,753).

Regarding claims 21 and 22, the combination of Swain, Macfarlane, Shiratani, and Baba does not teach a non-linear transformation.

Yamaguchi, in the field of endeavor of color image forming ("reproducing on an image output medium a color image corresponding to an original color image formed on an image input medium" at column 1, line 10), teaches that "In the case where the image input gamut is thus inconsistent with the image output gamut, colors reproduced on the output medium are made different from colors of the original image which has been formed on the input medium, as a result of which color-reproducibility of the image forming apparatus is degraded" at column 2, line 3. Furthermore, "to correct such a color-inconsistency and improve the color-reproducibility of the image forming apparatus, a color-compression processing is generally conducted before the above-described color-proofing" at column 2, line 15. As depicted in figure 4, steps S1 to S7 "... the three primary color component signals are converted into values of CIE-L*a*b* color system in a step S1 ..." at column 9, line 17. Equations 1-3 are three non-linear transformation for L*a*b* colorimetric system.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the color image deviation analysis method of the Swain, Macfarlane, Shiratani, and Baba combination, with non-linear transformation as taught by Yamaguchi, in order "to correct such a color-inconsistency and improve the color-reproducibility" at column 2, line 15.

7. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Swain, Macfarlane, Shiratani, and Baba as applied to claims 15 and 16 discussed above, and further in view of Shimura et al. (US 6,486,981 B1).

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Regarding claims 25 and 26, the combination of Swain, Macfarlane, Shiratani, and Baba does not teach a low pass filter.

Shimura, in the field of endeavor of color image processing ("color image processing method and apparatus capable of coding and storing color image data" at column 1, line 11), teaches a way to sampling the color image by changing the sampling rate as depicted in figure 6, numerals 85 and 86 for Cb and Cr components: "... input data is subject to the sub-sampling in the sub-sampling units 85 and 86 at the sub-sampling ratio $Y:Cb:Cr=4:2:2$..." at column 8, line 24. This means that the chrominance components Cb and Cr of the pixel data are in half resolution relative to the luminance component Y in a horizontal direction of the image since the human visual system is less sensitive to chrominance than luminance. Furthermore, "uniform color space such as CIE 1976 $L^*a^*b^*$ or CIE 1976 $L^*u^*v^*$ can be employed as the color space besides the YCrCb space described above" at column 11, line 34.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the color image deviation analysis method of the Swain, Macfarlane, Shiratani, and Baba combination, with low pass filter technique as taught by Shimura to take advantage of the fact that human visual system is less sensitive to chrominance than luminance. By so doing, the data space can be saved and the processing speed increases.

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8. Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Swain, Macfarlane, Shiratani, and Baba as applied to claims 15 and 16 discussed above, and further in view of Buzuloiu et al. (US 6,751,348 B2).

Regarding claims 33 and 34, the combination of Swain, Macfarlane, Shiratani, and Baba teaches that plurality of images used: “a learning type image classification apparatus which is capable of classifying a plurality of images” at Shiratani column 4, line 12. The combination of Swain, Macfarlane, Shiratani and Baba does not explicitly disclose the tolerance window.

Buzuloiu, in the field of endeavor of image detection (“pixels of a questionable image are compared with a color reference database” at column 1, line 9), teaches a way to identify the color as depicted in figure 1, numerals 16-18: “block 16, color detection begins by sampling pixels from a questionable image, the reception of which is indicated by input 17, and compares the color of each sampled pixel with the colors in the color prototype database. When a pixel is found to match a color in the color prototype database, a texture analysis is performed in an area around the questionable pixel (block 18). If the area around the pixel is uniform in color within a pre-determined variance, the area is considered to be potentially skin ...” at column 3, line 42. Without departing from the scope and spirit of Buzuloiu’s methodology, the variance can be used as the tolerance window.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the color image deviation analysis method of the Swain, Macfarlane, Shiratani, and Baba combination, with tolerance window as taught by

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Buzuloiu, to determine the color or “the variance of the surrounding pixels is used as a measure of skin texture” at Buzuloiu column 3, line 57.

9. Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Swain, Macfarlane, Shiratani, and Baba as applied to claims 15 and 16 discussed above, and further in view of Harrington et al. (EP 0 473 432 B1).

Regarding claims 35 and 36, the combination of Swain, Macfarlane, Shiratani, and Baba teaches a method to detect color image deviation. The combination of Swain, Macfarlane, Shiratani, and Baba does not explicitly disclose the image as print images.

Harrington, in the field of endeavor of color printing (“highlight color printing which preserves information important to the viewer” at page 2, line 4), teaches the application of print image with “mapping of full color images to highlight color images in which information important to the viewer is preserved” at page 2, line 54.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the color image deviation analysis method of the Swain, Macfarlane, Shiratani, and Baba combination, to the color printing as taught by Harrington, in order “preserves information important to the viewer” at page 2, line 4.


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Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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